COURSE SHEET

Computational Intelligence year 2023-2024

	1. About the program	
1.1	University	Universitatea din Piteşti
1.2	Faculty	Sciences, Physical Education and Computer Science
1.3	Department	Mathematics-Computer Science
1.4	Field of study	Informatics
1.5	Cycle of studies	Master
1.6	Study Program / Qualification	Advanced techniques for information processing/ Advanced techniques for
		information processing

2. Discipline data

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2.	2.1 Name of the discipline				Corr	putational Intellige	nce					
2.	2.2 The holder of the course activities				Doru	Doru Anastasiu Popescu						
2.	2.3 Holder of laboratory activities				Doru	a Anastasiu Popeso	cu					
2.	4	Year of study	2	2.5	Semester	1	2.6	Type of assessment	E	2.7	Discipline regimen	0

3. Estimated total time

3.1	Number of hours per week	4	3.2	of which course	2	3.3	laboratory	2
3.4	Total hours of the curriculum	56	3.5	of which course	28	3.6	laboratory	28
Distri	bution of the time fund							hours
Study	y by textbook, course support, biblio	graphy a	nd note	S				56
Addit	ional documentation in the library, c	on specia	lized ele	ectronic platforms a	and in the	e field		38
Preparation of seminars/ laboratories, themes, papers, portfolios, essays 40						40		
Tutoring 6						6		
Examination 4						4		
Other activities						-		
3.7 Total hours of self-study 144								
3.8	3.8 Total hours per semester 200							

3.9 Number of credits

4. Preconditions (where applicable)

4.1	Curriculum	Artificial Intelligence, Data Mining Techniques, Probabilities and Mathematical Statistics
4.2	Skills	Competences acquired in the courses Artificial Intelligence, Data Mining Techniques, Probabilities and Mathematical Statistics, Java and C # Programming

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	5. Conditions (where applicable)	
5.1	Conduct of the course	Room with video projector
5.2	Conducting the seminar/laboratory	Room with video projector and computer equipment

6. Acquired specific skills

Professional skills	 Programming in high level languages. Development and maintenance of computer applications. Use of IT tools in an interdisciplinary context. Using the theoretical bases of computer science and formal models. Design and management of databases.
Transversal competences	 Applying the rules of organized and efficient work, of responsible attitudes towards the didactic-scientific field, for the creative capitalization of one's own potential, respecting the principles and norms of professional ethics. Efficient development of activities organized in an inter-disciplinary group and development of empathic capacities for interpersonal communication, relationships and collaboration with various groups The use of efficient methods and techniques for learning, informing, researching and developing the capacities to capitalize on knowledge, to adapt to the requirements of a dynamic society and to communicate in Romanian and in a language of international circulation.

7. The objectives of the discipline

7.1 The general objective of the discipline	Presentation of important chapters in the field of computational intelligence; knowledge modeling through rough sets, fuzzy sets and numbers, evolutionary algorithms and game theory.
7.2 Specific objectives	At the end of the course, the student will be able to: - use the notions of fuzzy logic; - to use genetic algorithms in solving general problems. - to use algorithms and notions from game theory in solving some problems

8. Contents

8.1. Course

Nr. Teaching Observations

		ho	methods	Resources		
		urs		used		
1	Computational intelligence. Introductory notions.	2	lecture			
2	Methods of representing knowledge using rough sets	4	debate			
4	Fuzzy numbers Specific operations	4	individual themes			
		4	group work	computer		
5	Fuzzy logic systems		Description and	projector		
6	Genetic algorithms and evolutionary strategies. Basic notions. The selection. The mutation. Crossing. Evolution.	6	exemplification Demonstration Heuristic			
7	Come theory Strategies	4	Conversation			
/ Rił	Jiography	4	Exercise			
1	Rutkowski I. Computational Intelligence. Methods and Techniques	Snring	er 2008			
1. ว	Kullor, D., Eriodman D., Brobabilistic Granhical Models Bringiples and	d Tochr	NIT Proce	2000		
2.	Achieve D. Evolutioners Constitution for Medaling and Optimication		ilques, Mill Pless	, 2009		
3.	Ashlock, D., Evolutionary Computation for Widdeling and Optimizati	on, Spri	nger, 2005			
4.	Kasabov, N., Evolving Connectionist Systems, Springer, 2007					
5.	Negoita, M., Neagu, D., Palade, V., Computational Intelligence for N	/lodeling	g and Optimizatio	on, Springer,		
20	05					
6.	Tenne, Y., Goh, C-K, Computational Intelligence in Optimization, Sp	ringer, 2	2010			
7.	Engelbrecht, P., Computational Intelligence.An Introduction, Wiley,	2002				
8.	Doru Popescu Anastasiu, Andrei Eugeniu Ioniță, Combinatorică si te	oria gra	nfurilor, Editura R	habon, Tg.		
Jiu	. 2005	Ū	·			
9	, Doru Anastasiu Ponescu, Bazele Programării, Java dună C++, Editura	a I & S Sc	oft. 2019. ISBN: 9	78-973-		
88	28037-9-4 2019					
10 Dory Anastasiy Popescy Nicolae Bold Daniel Nijloveany A Method Based on Genetic Algorithms for						
10	norating Accessment Tests Used for Learning on 52.60 ISSN 2205	0610 71	nic denetic Aigu	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		
Ge	Dere Arestesin Der Der Der Der Manitering, pp. 55-60, 155N 2595-	0010, 20	J10 Heine Constin A			
11	. Doru Anastasiu Popescu, Dan Radulescu, Monitoring of Irrigation s	systems	Using Genetic Al	goritnms,		
btn International Conference on Modeling, Simulation, and Applied Optimization, May 27-29, Istanbul,						
Tu	rkey, pp. 1-4, 2015					
12	. Doru Anastasiu Popescu, Nicolae Bold, Ovidiu Domsa, Generating	assessn	nent tests with re	strictions		
usi	ing genetic algorithms, 12th IEEE International Conference on Conti	rol & Au	tomation, June 1	3, 2016,		
Ка	thmandu, Nepal					
13	. Doru Anastasiu Popescu, Daniel Nijloveanu, Nicolae Bold, Generat	or of Te	sts for Learning (Check in Case		
of	Courses that Use Learning Blocks, International Conference in Meth	nodolog	ies and intelligen	t Systems		
for	Techhnology Enhanced LearningMIS4TEL 2018: Methodologies and	d Intellig	gent Systems for	Technology		
En	hanced Learning, 8th International Conference pp 239-244, Springe	r proce	edings.	07		
20	18https://doi.org/10.1007/978-3-319-98872-6.28 Print ISBN9-78-3	-319-98	871-9 Online ISI	RN978-3-		
20	9-98872-6 2018	515 50	, o, i o, onnite ioi	5113703		
1/	Dory Apostosiu Ponescu, Cabriel Ciprian Stanciu and Daniel Niilov		nnlication of Can	atic		
14	. Doi'd Allastasid Popescu, Gabilei Cipitali Staliciu alid Dallei Nijiow	callu, Aj	opilcution of Gen	elications		
Algorithm in the Generation of Exam resis, 9-th international workshop on Soft Computing Applications						
(50	JFA) 27-29 nov-2020		T	Ohaanstiana		
8.2	. Applications – Seminar / Laboratory	Nr.	Teaching	Resources		
	······································	hours	methods	used		
1	Problems grouping information into crowds. Java / C # implementation.	4	Explanation			
2	Operations with fuzzy sets. Applications	4	Description and			
3	Operations with fuzzy numbers. Applications	4	Case study			
4	Genetic algorithms. Java / C # implementation	4	Exercise	computer		

7 Game theory. Strategies. Java / C # implementation

Find problems. Java / C # implementation

Problems using genetic algorithms. Java / C # implementation

Bibliography

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1. Rutkowski, L. Computational Intelligence. Methods and Techniques, Springer, 2008

2. Koller, D., Friedman D., Probabilistic Graphical Models. Principles and Techniques, MIT Press, 2009

3. Ashlock, D., Evolutionary Computation for Modeling and Optimization, Springer, 2005

4. Kasabov, N., Evolving Connectionist Systems, Springer, 2007

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Problematization

Individual

themes Group work

Debate

projector

5. Negoita, M., Neagu, D., Palade, V., Computational Intelligence for Modeling and Optimization, Springer, 2005

6. Tenne, Y., Goh, C-K, Computational Intelligence in Optimization, Springer, 2010

7. Engelbrecht, P., Computational Intelligence. An Introduction, Wiley, 2002

8. Doru Popescu Anastasiu, Andrei Eugeniu Ioniță, Combinatorică si teoria grafurilor, Editura Rhabon, Tg. Jiu, 2005

9. Doru Anastasiu Popescu, Bazele Programării, Java după C++, Editura L&S Soft, 2019, ISBN: 978-973-88037-9-4 , 2019

10. Doru Anastasiu Popescu, Nicolae Bold, Daniel Nijloveanu, A Method Based on Genetic Algorithms for Generating Assessment Tests Used for Learning, pp.53-60, ISSN 2395-8618, 2016

11. Doru Anastasiu Popescu, Dan Radulescu, *Monitoring of Irrigation systems Using Genetic Algorithms*, 6th International Conference on Modeling, Simulation, and Applied Optimization, May 27-29, Istanbul, Turkey, pp. 1-4, 2015

12. Doru Anastasiu Popescu, Nicolae Bold, Ovidiu Domsa, *Generating assessment tests with restrictions using genetic algorithms*, 12th IEEE International Conference on Control & Automation, June 1-3, 2016, Kathmandu, Nepal

13. Doru Anastasiu Popescu, Daniel Nijloveanu, Nicolae Bold, *Generator of Tests for Learning Check in Case of Courses that Use Learning Blocks,* International Conference in Methodologies and intelligent Systems for Techhnology Enhanced LearningMIS4TEL 2018: Methodologies and Intelligent Systems for Technology Enhanced Learning, 8th International Conference pp 239-244, Springer proceedings,

2018https://doi.org/10.1007/978-3-319-98872-6_28 Print ISBN9 78-3-319-98871-9, Online ISBN978-3-319-98872-6, 2018

14. Doru Anastasiu Popescu, Gabriel Ciprian Stanciu and Daniel Nijloveanu, *Application of Genetic Algorithm in the Generation of Exam Tests*, 9-th International Workshop on Soft Computing Applications (SOFA) 27-29 nov-2020

9. Corroborating the contents of the discipline with the expectations of the representatives of the epistemic community, professional associations and employers in the field related to the program

The competencies acquired within the discipline allow the graduates to use efficiently the notions of Computational Intelligence in solving the requirements related to the practice and research in the field of informatics.

10. Evaluation

Activity Type		10.1 Assessment criteria	10.2 Assessment methods	10.3 Percent of final grade	
10.4 Course	Problem sol	ving skills	Practical test (algorithms and problems)	30%	
10.5 Seminar/	Solving the p	proposed problems	Laboratory activity	30%	
Laboratory	aboratory Presentation and explanation of implementation Project		Project	40%	
10.6 Min	imum	Grades of at least 5 at the laboratory activity and at the final evaluation (solving 50% of the requirements);			
performance	standard	final grade minimum 5.			

Date of completion 19.09.2023

Course holder Conf. univ. dr. Doru Anastasiu Popescu Laboratory holder Conf. univ. dr. Doru Anastasiu Popescu

Date of approval in the DepartmentDirector Department (provider)19.09.2023Conf.univ.dr. Doru CONSTANTIN

Director Department (*beneficiary*)) Conf.univ.dr. Doru CONSTANTIN